

quills and tail deep brown; bill yellow; the feet lead-colour, and the membrane that borders the toes yellow.

Total length, 20 inches; bill, 2 inches and 2 lines; wing, 10 inches; tarsi, 1 inch and 10 lines.

It differs from the typical *Podicu* in having a portion of the lores naked, in the greater breadth of the tail-feathers, and in their being rather rigid.

The only specimen I have seen, from which this description and the drawing have been made, was presented to the British Museum by the Right Hon. the Earl of Ellenborough.

## MISCELLANEOUS.

*On Polycotyledonous Embryos.* By M. P. DUCHARTRE.

SINCE Jussieu, by a happy application of a principle first asserted by Ray, has taken the characters furnished by the embryo for the basis of the great divisions of the vegetable kingdom, all the questions relating thereto have become highly important. The first of these characters is that deduced from the number of the cotyledons, according to which all embryonal plants have been divided into monocotyledons and dicotyledons. This number is nearly always, in fact, one or two; but according to the majority of botanists, it exceeds two in the embryo of a small number of plants to which the denomination of polycotyledonous has been applied. By a remarkable peculiarity these plants are distributed among several families and also genera of which the majority of species have the more frequently but two cotyledons; whence it has been considered impossible to establish for them a special class. The object of this memoir is to examine if these plants are really provided with several distinct cotyledons, or have only two which are deeply divided into a variable number of lobes.

I first show by several examples that the cotyledons, or the seminal leaves of the dicotyledonous plants, have a very marked tendency to divide on their median line, in various degrees, sometimes so deeply as to cause each cotyledonous lobe to be wrongly considered as constituting a distinct cotyledon. Amongst other facts, I have described and figured germinating plants of *Dianthus chinensis*, Linn., which show all the degrees of division from the slit of one of the seminal leaves to the complete division of each one of the two into two nearly independent lobes. I also show by a series of different states, that the embryo of the *Macleya* owes to a division of its cotyledons the remarkable appearance which has caused it to be described as possessing sometimes from three to four cotyledons. I nevertheless observe that, in some very rare cases, the binary whorl of cotyledons may become ternary; of which examples are enumerated.

I then pass to those embryos the cotyledons of which are normally bipartite, and describe the development of that of *Amsinkia* and their germination. I show that the two cotyledons of these plants, sim-

ple at their first appearance, each very soon developes two equal lobes ; and that, from this moment until when the two seminal leaves have attained their complete development, it becomes more and more evident that each of them is only divided in the direction of the medial line.

A complete analogy of development and organization induced me then to study the embryo of *Schizopetalon Walkeri*, Sims., to which Mr. Robert Brown, in the 'Botanical Register,' tab. 752, and recently M. Barnéoud, have assigned four distinct and separate cotyledons, contrary to the opinion expressed by Mr. W. Hooker in the 'Exotic Flora,' tab. 74. I show that the embryo of this plant passes through a series of analogous states to those which I have mentioned in *Am-sinkia* ; that its germination resembles that of the latter plant, although the division of each of its two seminal leaves into two lobes is still deeper ; lastly, I adduce in support of these facts those which the anatomical structure furnishes, and I show that in the germinations of *Schizopetalon* we find two fibro-vascular bundles which correspond to the undivided portion of the two cotyledons, and which, higher up, separate into two branches, each destined for one of the two cotyledonary lobes. This singular genus of Cruciferae should consequently be removed from the list of polycotyledonous plants.

After having taken a glance at the species of *Canarium* and *Aga-thophyllum*, the embryo of which appears to have but two cotyledons, each divided into three or more lobes, I come to those Coniferae that have been considered to possess several cotyledons, and in which it is generally agreed the type of the polycotyledonous embryos is found. This opinion was admitted in science on the authority of Gærtner, Salisbury, L. C. Richard, and M. A. Richard. It is entirely opposed to that expressed by Adanson and Jussieu, who state that these Coniferae have but two cotyledons deeply divided into a considerable number of long narrow lobes. Although this latter view has been abandoned by modern botanists, I have attempted to prove that it alone is based on facts. After having discussed the objections which have been raised against it by Gærtner and M. A. Richard, I deduce from a careful examination of the embryo in seventeen different species, and of that of the germination in some of them, the following results.

The pretended multiple cotyledons of the Firs, and of the genera in which the embryo is organized on the same plan, are not verticillate, that is to say, arranged regularly in a circle around a point. On the contrary, they always occur divided into two opposite groups, absolutely placed like two ordinary cotyledons. In each of these two groups, the appendages which have been regarded as distinct and separate cotyledons, and which I regard only as lobes, are generally pressed one against the other, whilst a very marked space exists between the two groups, sometimes large enough to occupy, towards the centre, about a third of the total diameter of the embryo. Often, and particularly in the case where the lobes are numerous, the embryo is compressed in the direction of the breadth of the two cotyledons. Viewing the embryo from the top, the pretended mul-

tiple cotyledons are frequently seen ranged in two parallel lines, and these two lines are then separated one from the other by a very visible slit. This intercotyledonary slit is continued to the two opposite sides of the embryo, where it is easily recognised by its greater size, especially in some species (*Pinus pinaster*, Solan., *Pinus excelsa*, Wall., &c.). In certain cases these two opposite lateral slits gradually descend lower than those interposed between the lobes; the assertion of Jussieu therefore, although too much generalized, was based on facts. To recognise, in these doubtful cases, the arrangement of the cotyledonary lobes into two groups, the best plan is to make with a very sharp instrument, a transverse section towards the middle of the lowest cotyledons; the remaining basilar portion evidencing clearly, in almost every case, the arrangement here described.

To these facts furnished by the adult embryo, I add others taken from the germination and phyllotaxy. M. Lestiboudois has likewise recently been led, by observations on anatomical phyllotaxy, to admit that all the Coniferæ are dicotyledonous.

The species of *Ceratophyllum* have been and are still described as possessing four unequal cotyledons in pairs. But the observations of M. Schleiden, with which mine agree on nearly every point, have sufficiently shown that it is an error arising from the first whorl of plumular leaves, and which always appear binary, having been confounded with the two cotyledons.

After having removed from the category of polycotyledonous plants nearly all those admitted as such, there remains in my opinion but some species of *Persoonia* which should provisionally be referred to this group, upon the authority of Mr. R. Brown, and respecting which I am unable to form an opinion owing to want of material.—*Comptes Rendus*, xxvii. p. 226.

#### *Preparation of Pineapple Fibres in Singapore for the Manufacture of Pina Cloth.*

Some time ago we observed, in the neighbourhood of Batu Blyer, a number of Chinese labourers employed in cleaning the fibres of pineapple leaves for exportation to China. As we believe this to be a new and promising branch of industry in this settlement, where numerous islets are covered by the pineapple, it would be well to draw the attention of the Chinese and Bugis frequenting or inhabiting these islets to the subject. The process of extracting and bleaching the fibres is exceedingly simple. The first step is to remove the fleshy or succulent side of the leaf. A Chinese, astride on a narrow stool, extends on it, in front of him, a pineapple leaf, one end of which is kept firm by being placed beneath a small bundle of cloth on which he sits. He then with a kind of two-handled plane made of bamboo removes the succulent matter. Another man receives the leaves as they are planed, and with his thumb-nail loosens and gathers the fibres about the middle of the leaf, which enables him by one effort to detach the whole of them from the outer skin. The fibres are next steeped in water for some time, after